Published in final edited form as:

J Am Acad Child Adolesc Psychiatry. 2008 March ; 47(3): 239. doi:10.1097/CHI.0b013e3181635e00.

Applied Brain Imaging

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Neuroimaging is increasingly relevant to child and adolescent psychiatrists. Once a set of esoteric research techniques relegated more to the province of a pediatric neurologist or radiologist, brain imaging now has a place in the mainstream of child and adolescent psychiatry. It is already being used widely in the study of psychopathology and normal brain development and shows genuine potential for future use in clinical monitoring and to aid in decision making. Imaging offers a way to measure brain structure and function safely in living children. This has most commonly been done at a single point in time, but scans are now increasingly conducted repeatedly over time measuring the vicissitudes of development to identify the determinants of disease progression and the nature of therapeutic change. More than any previously available neurobiological technique or research tool, imaging offers the opportunity to define the neural systems that mediate the genetic and environmental determinants of brain development with their cognitive, emotional, and behavior consequences. The promise of tracking and predicting the trajectories of an illness and of developing individualized therapeutic interventions for children has never been greater, and it is founded to a large extent on the capacity of imaging techniques to define these pathways that link genes, brain, behavior, and environmental context of a developing child.

We believe that because of the complexity of this work, child clinicians and nonneuroimaging researchers often have less exposure to neuroimaging than is ideal for the growth of our field. Therefore, in collaboration with the editorship of *JAACAP*, we are launching a column that reviews, in the simplest possible terms, the methods and uses of brain imaging in child and adolescent psychiatry and what it has taught us thus far about brain development and childhood psychopathologies. Our goal is to help readers to become informed consumers of the neuroimaging literature, to become aware of the advantages and disadvantages of various imaging modalities, and to be able to identify the strengths and limitations of imaging studies. Given the predominant use of magnetic resonance imaging in child and adolescent psychiatry (primarily because of its safety and other methodological advantages), we pay particular attention to this imaging modality.

We begin this column with a review of the most basic principles of neuroimaging that any reader needs to begin reading this literature. In this issue, we describe what an image is. We

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Disclosure: The authors report no conflicts of interest.

will follow in the coming months with descriptions of each of the major modalities, written by experts in these techniques. These will be interspersed with reviews of current research and clinical applications of these techniques, beginning with what we have learned about normal development and proceeding through childhood disorders such as autism, obsessive-compulsive disorder, attention-deficit/hyperactivity disorder, Tourette syndrome, bipolar disorder, schizophrenia, depression, anxiety, dyslexia, and eating disorders, each written by imaging researchers who have made seminal contributions in the study of these disorders in children and adolescents. These columns will offer a comprehensive yet easily accessible summary of the contributions of neuroimaging to child and adolescent psychiatry. We invite feedback from readers about these columns, and we look forward to an interesting dialogue about the evolving roles that brain imaging is playing in our field.

Acknowledgments

This work was supported in part by NIMH grants T32-MH16434 and MHK02-74677, funding from the National Alliance for Research on Schizophrenia and Depression, and the Suzanne Crosby Murphy Endowment at Columbia University.